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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,758	03/18/2004	Hitoshi Ito	02887.0268	5319

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EXAMINER

DOAN, THERESA T

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 10/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/802,758

Applicant(s)

ITO, HITOSHI

Examiner

Theresa T. Doan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 10-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-7 and 9 is/are rejected.
- 7) ☒ Claim(s) 4 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 031804.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-9 in the reply filed on 08/11/05 is acknowledged.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Drawings

3. Figures 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Information Disclosure Statement

4. The prior art documents submitted by applicant in the Information Disclosure Statement filed on 03/18/04, have all been considered and made of record (note the attached copy of form PTO-1449).

Claim Objections

5. Claims 4-5 are objected to because of the following informalities:

In claim 4, line 1, a word "if" before "an angle" needs to be deleted.

In claim 5, lines 1-2, the words "even if" before "a facet" needs to be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 5-6 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Masato (JP 2000-260952) of record.

Regarding claim 1, Masato (Fig. 6) discloses a semiconductor device, comprising:

a semiconductor substrate 11 (paragraph [0118], lines 1-2);

a source region 19, which is formed in a surface side of the semiconductor substrate 11 (paragraph [0122]);

a drain region 19 that is formed in the surface side of the semiconductor substrate 11, which is apart from the source region (see Fig. 6 Labeled by the examiner below and paragraph [0122]);

a gate electrode 16 that is formed on the semiconductor substrate via a gate insulating film 15 and which is between the source/drain regions 19 (paragraph [0120], lines 1-2);

an element isolation insulator 14 which is formed on the surface side of the semiconductor substrate 11 to provide electrical insulation from other elements, a height of a surface of the element isolation insulator 14 being equal to a surface of the semiconductor substrate 11 (see Fig. 13 Labeled by the examiner below and paragraphs [0118], lines 2-4 and [0143], lines 1-3);

a stopper 35 which is formed of a SiN material (paragraph [0163]) different from a SiO material of the element isolation insulator 14 (paragraph [0021]) and which is at a predetermined distance from the semiconductor substrate 11 so as to protrude from the surface of the element isolation insulator 14; and

an elevated source/drain 21 which is formed on the source / drain regions 19 so as to be elevated from the surface of the semiconductor substrate 11 (see Fig. 4 and paragraph [0141]).

FIG. 6

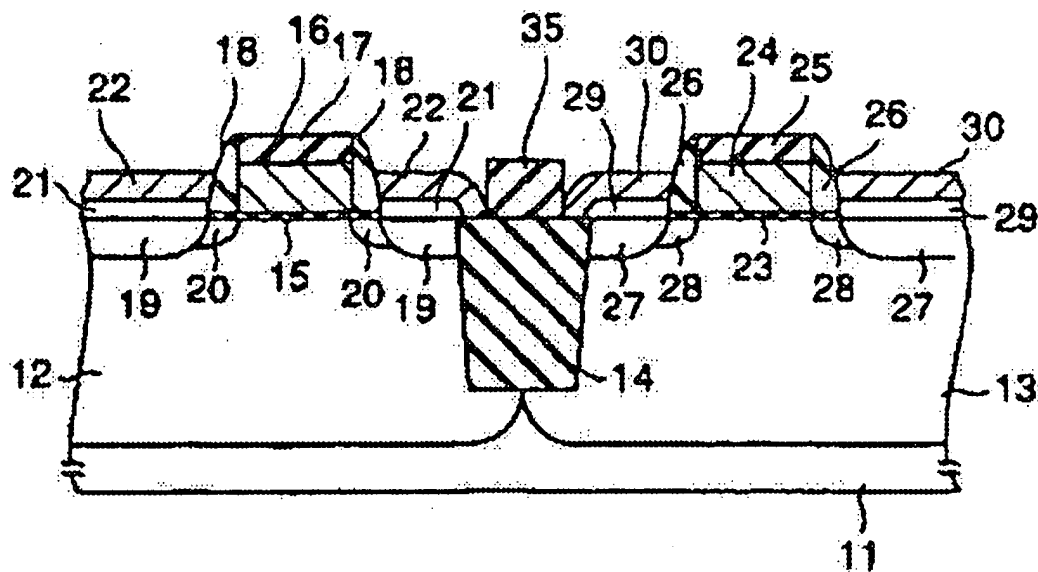
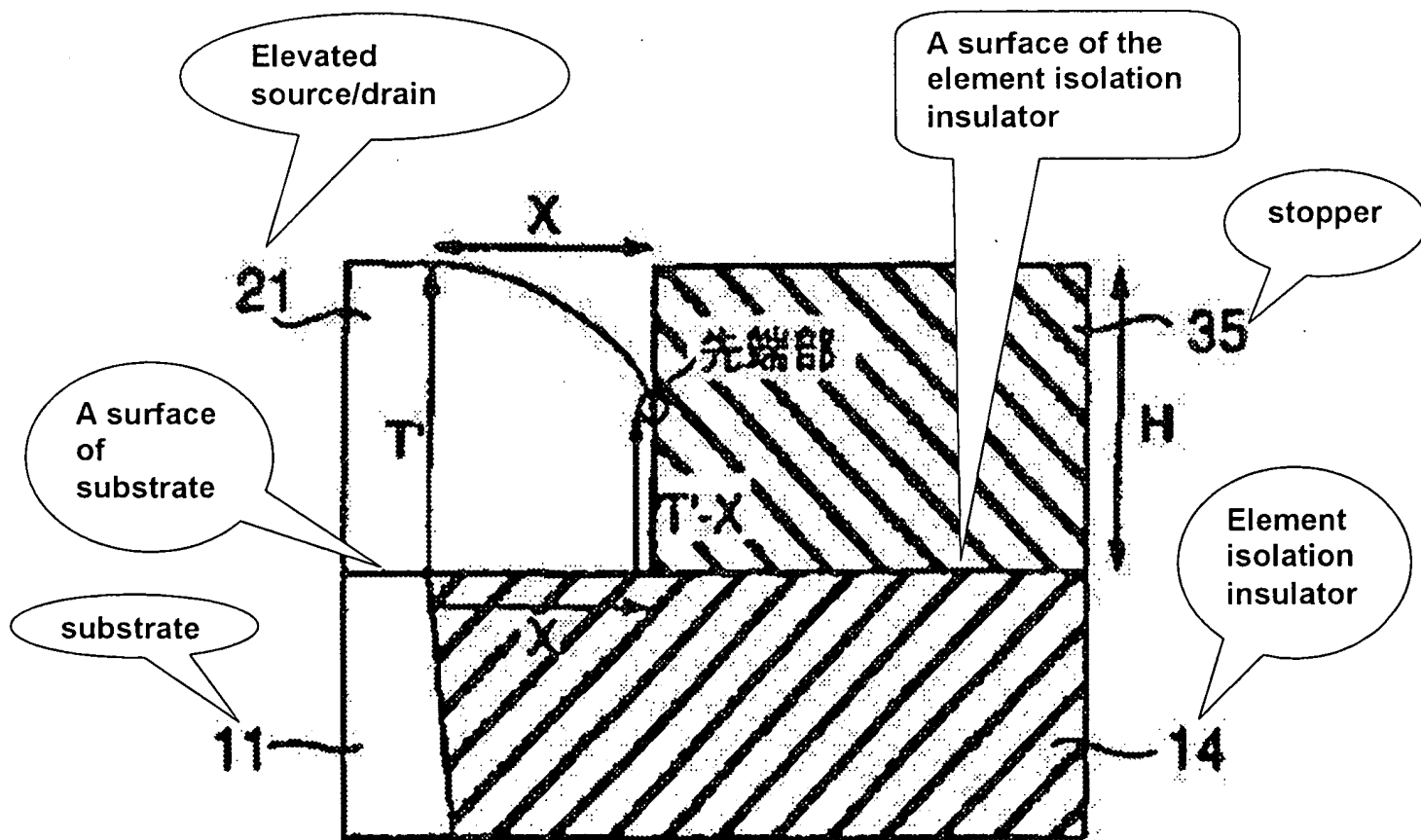


FIG. 13



Regarding claim 2, Masato discloses that the element isolation insulator 14 is formed of a material including silicon oxide as its major constituent (see paragraph [0021]).

Regarding claim 3, Masato discloses that the stopper 35 is formed of a material including silicon nitride as its major constituent (see paragraph [0136]).

Regarding claim 5, Masato discloses that a facet appears in the elevated source/drain 21, the elevated source/drain grows in a vertical direction after it touches the stopper 35 (see Fig. 13 above).

Regarding claim 6, Masato discloses that the stopper 35 is formed on the element isolation insulator 14 (see paragraph [0129], line 1).

Regarding claim 9, Masato discloses that the elevated source/drain region 19 is formed by epitaxially growing silicon (see paragraph [0122]).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masato (JP 2000-260952) of record in view of Hokazono et al. (U.S. Pat. 6,545,317).

Masato's Fig. 6 does not disclose that the element isolation 14 comprises a first insulating film and a second insulating film formed inside the first insulating film.

However, Hokazono (Fig. 7) teaches a semiconductor device having an elevated source/drain 16 formed on an element isolation insulator, the element isolation insulator comprises a first insulating film 61 of SiN (column 13, lines 17-18) formed inside a trench and a second insulating film 62 of SiO (column 13, lines 17-18) formed inside the first insulating film 61. Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the device structure of Masato by forming the element isolation insulator comprising the first insulating film of SiN and the second insulating film of SiO formed inside the first insulating film because the first insulating film of SiN would have better wetting in silicon epitaxial growth than the second insulating film of SiO. And because of better wetting in silicon epitaxial growth, the elevated source/drain silicon film would run reliably onto the first insulating film of SiN, as taught by Hokazono (column 13, lines 43-51).

Allowable Subject Matter

10. Claims 4 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The prior art of record fails to disclose all the limitations recited in the dependent claims 4 and 8. Specifically, the prior art of record fails to disclose an angle, which is formed by the elevated source/drain formed on the top of the element isolation insulator between the semiconductor substrate and the stopper and a sidewall of the semiconductor substrate is taken as θ , a distance between the sidewall of the semiconductor substrate and the stopper is taken as A, and a height by which the stopper protrudes from the surface of the element isolation insulator is taken as B, a condition of $B > A/\tan \theta$ is satisfied, as recited in claim 4. The prior art of record also fails to disclose the element isolation insulator comprises: a first insulating film, a second insulating film and a stopper, the stopper embedded between the first insulating film and the second insulating film and formed so as to protrude from a surface of the first insulating film, as recited in claim 8.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Theresa T. Doan whose telephone number is (571) 272-1704. The examiner can normally be reached on Monday to Friday from 7:00AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WAEL FAHMY can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent

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Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Theresa Doan
October 11, 2005.